

I. Project Title: General Hydrology Support

II. Principal Investigator:  
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III. Project Summary:

The Service's Division of Water Resources provides basic hydrology support to Recovery Program researchers and undertakes tasks to support the Recovery Program in basic data collection and monitoring projects. Accomplishments during FY 2003 include: 1) collecting temperature data at 10 sites on the Green River and four sites on the Gunnison River, and assembling a temperature database for use by Recovery Program researchers; 2) coordinating contracting for Yampa River sediment monitoring; 3) providing technical hydrology support for a wide range of Recovery Program activities on a year-to-year basis; and 4) coordinating other Recovery Program efforts relating to hydrology and temperature analysis.

IV. Study Schedule: Initial Year - 1990, Final Year - Ongoing.

V. Relationship to RIPRAP: Colorado and Green Rivers Action Plans I.  
Provide and protect instream flows.

VI. Accomplishments of FY 2003 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

A. Temperature Data Collection

Temperature data collection during FY-2003 went well, no thermographs were stolen and very little data were lost from thermographs being out of the water at the lowest flow conditions since we began collecting temperature data in 1987. *Because of low flows in the Yampa River in 2003, we continued to have problems with river users taking thermographs. Two thermographs were stolen near Craig and we have not been able to find one thermograph any the Ouray Refuge, the tree the thermograph may have been cut down by beavers or the unit was stolen. Most locations have multiple thermographs hidden at different location unfortunately both thermographs at Craig were stolen, data was collected at Shepard Crossing about 8 miles below Craig so a nearby source of data is available. Stolen thermographs were replaced by the newer five year units. The new thermographs were placed at slightly different location to discourage theft.*

Some additional time was spent in FY 2003 providing data to the biologist and

consultants working on other Scopes of Work and related projects. Work included retrieving data reformatting data and transmitting data. Routine temperature data continued in 2003 along with preparing the 2003 for archiving and publishing on the web. The yearly process includes downloading data in the field in March, July, and October, graphically plotting the data and visually checking the data and preparing presentation quality graphs using Excel spreadsheets. The spreadsheets are then web enabled and linked to the River data Web page. The temperature data can be accessed and downloaded from the River data Web page at <http://www.r6.fws.gov/riverdata/> or by email request from FWS Division of Water Resources (address above). A photo was included on the web page to display the general location of each thermograph. GPS location for each thermograph is available by request, for security purposes the exact locations are not provided on the web page. We also continued organizing the temperature data collected since 1987.

A new temperature monitoring project got underway in 2001 and continued in 2003 to monitor real-time water temperatures at Echo Park above and below the confluences of the Yampa and Green rivers. After investigation of cost associated with purchasing equipment to monitor and transmit data out of Echo Park it was determined that the budget for the project was only sufficient to purchase equipment for one real-time monitoring station and four stations were needed. This development was brought to the attention of the Flaming Gorge work team and Recovery Program staff and a decision was made to scale back the project and try to accomplish the same objective by adding real-time temperature monitoring to the Deerlodge Park USGS gage and to add a USGS temperature gage at the Gates of Lodore. The equipment for the gages was purchased by Wyoming using funding which usually is earmarked for the Division of Water Resources out of Wyoming annual contribution to the Recovery Program. The equipment was ordered in September, permits were obtained from Dinosaur National Monument, and all the equipment was installed in the spring of 2003 prior to spring runoff.

The Grand Junction CRFP office currently maintains thermograph at six locations on the Colorado River and one on the Gunnison River. Current installation protocol calls for two thermographs to be deployed at separate but relatively nearby locations so that backup data will be available if one should be lost or stolen. Older Onset Tidbit thermographs with three year batteries and increase storage capacities are being phased out and replaced by the newer, cheaper, 5year Onset Tidbit devices.

Grand Junction CRFP continued data collection in 2003 as well as converting the raw 2-hour interval data into daily means. In 2002 and 2003, the Grand Junction CRFP office has made an effort too caught up with data reduction and archiving. Substantial progress was made in 2003 but, there is still a ways to go.

## B. Hydrology Support for Biological Opinions

The Division of Water Resources monitored endangered fish releases from Flaming

Gorge, Ruedi, and the Aspinall Unit during the spring runoff and post runoff period. The interest of the Recovery Program was represented at the quarterly operational meetings, where input was provided on flow patterns and protection of water for endangered fish. The Division of Water Resources also provided support to researchers working on flow recommendations, management plans and related reports. Specific work accomplished is addressed under the appropriate work task below.

Green River: Attended Meetings of the Flaming Gorge Work Group and represented the Recovery Program at a public information meeting held in Vernal Utah.

Gunnison River: The Division of Water Resources continued to provide support in developing data for the synthesis, and worked with Chuck McAda in resolving issues identified in the minority report. Coordinated peers review of Gunnison River scopes of work for Geomorphology work.

Colorado River: Presented a Power Point presentation at the annual Researchers meeting on the management of fish water during the 2002 drought. I worked with Recovery Program staff and CWCB to set up procedures and accounting methods for tracking depletions under the Colorado River Programmatic Opinion.

#### C. Hydrology Support for Development of Flow Recommendations

Yampa River Operation and Management Plan: The Division of Water Resources provided assistance to the Program Director's Office by coordinating meetings, developing scopes of work for gaging, hydrology model review, and developing Annual project reports. The Division of Water Resources also supported the Yampa Management Plan by reviewing documents and attending Hydrology work group meetings to provide historically prospectively.

Work continued with USGS (Mike Carpenter and Ed Wick) to maintain sediment bed load monitoring equipment on the Green River at echo Park and the Jensen razorback sucker spawning bars. Work included obtaining monitoring permits from the Park Service, and filing research reports with the Recovery Program and the Park Service.

Work continued on developing e flow recommendations for the Little Snake River

#### VII. Recommendations:

Grand Junction CRFP should transfer historic data reduction to FWS Division of Water Resources so that the backlog can be cleaned up and the data can be added to the riverdata web page.

The work undertaken by FWS Division of Water Resources is, for the most part, in support of other research projects or activities such as flow delivery, flow quantification, and habitat restoration, all of which have a direct impact on the recovery of the Colorado River

endangered fish. The direct quantification of the success of many of the activities is difficult because most of the activities are long-term in nature.

VIII. Project Status: Ongoing and on-track.

IX. FY 2003 Budget Status:

A. Funds provided: \$ 65,500

B. Funds expended: \$ 65,500

C. Difference: \$ 0

X. Status of Data Submission: Not applicable.

XI. Signed: George Smith  
Principal Investigator

November 14, 2003  
Date:

APPENDIX: Reports, the temperature data collection, and database for water year 2003 are placed on the Recovery Program's Home Page for access by researchers by December 31, 2003.

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